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Forests in populated areas of the world constitute the reserve land use, what is left over after clearing for agriculture and urban uses. Forest cover has declined globally, from an estimated 6 billion ha of original forest extent to the present 3.87 billion ha. Yet forest cover is increasing in North America and Western Europe, as a result of shifts from marginal agriculture. Market forces, changing trade policies, agricultural reforms, and conservation efforts are driving conversion of cleared land back to trees in many countries. Nevertheless, the area in forest plantations is only 187 million ha, although increasing.

Many existing forests experience disturbances and stresses that negatively affect ecological stability or maintain the forest in a condition that can be seen as unsustainable. Global assessments of forest condition identify the factors causing loss of forest cover and degradation of remaining forests, including changing land use, increasing demand for fiber, and exogenous stresses such as global climate change, air pollution, and loss of biodiversity through fragmentation.

Throughout the boreal and temperate zones, forest restoration efforts attempt to counteract negative trends. Plantation forestry remains the most effective approach to restoration of forest cover to large areas through afforestation, and recent trends point toward more complex plantations. Rehabilitation of degraded forests increasingly relies on re-establishing natural disturbance regimes and emphasizes "close-to-nature" approaches to regeneration and stand management. Nevertheless, confusion reigns as the term restoration is used indiscriminately, with no consensus even among practitioners in its meaning. Equally confusing is the use of terms such as natural, degraded, and semi-natural to describe forest cover conditions.

To clarify what restoration means, it is helpful to consider the dynamic relationship between processes that degrade and processes that restore forests in light of two dimensions, changes in land cover, land use, or both. If we consider the undisturbed, idealized natural mature forest as a starting point, then conversion to other land uses such as agriculture (cultural landscape) or pasture (semi-natural landscape) is through deforestation. Relatively frequent but moderate disturbance (plowing, herbicides, grazing) maintains the non-forest cover.

Similarly, a change in both land cover and land use occurs when forests are converted to urban areas, flooded by dams, or removed along with topsoil/overburden in mining and extractive activities. Such drastic

conversion usually involves severe disturbance and the non-forest cover is maintained more or less permanently by structures.

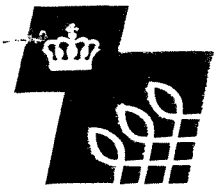
Even-aged harvesting of mature forest in a sustainable manner is a change of land cover but not land use. A new, young forest will result from natural regeneration or by reforestation (i.e., planting trees in a cutover). Unsustainable harvesting without securing adequate regeneration, such as high grading, may degrade stand structure or diversity. Pollutant loading, outbreaks of insects or diseases (especially exotic species), fire suppression and disruption of natural fire regimes, invasion by aggressive exotic plants, or disasters such as hurricanes and other severe wind events or wildfires can degrade forest stands and change attributes of land cover, but do not change land use. In all these instances, human intervention to restore species diversity or stand structure can be termed rehabilitation.

Reclamation of urbanized land usually requires extensive modification. This may include stabilization of spoil banks or removal of water control structures, followed by tree planting. Because severe site degradation may limit the possibilities for reclamation, this is sometimes called replacement (Bradshaw, 1997).

Generally, restoration connotes some transition from a degraded state to a former "natural" condition. All the restorative activities described (afforestation, reclamation, and rehabilitation) have been called forest restoration, although to the purist none would qualify as true restoration (Bradshaw, 1997). In the narrowest sense, termed ecological restoration, this requires a return to an ideal natural ecosystem with the same species diversity, composition, and structure as occurred before human intervention (Bradshaw, 1997) and as such is probably impossible to attain (Cairns, 1986). The approach adopted here may be termed functional restoration. In this approach, the focus is on restoring naturally functioning forests. The term forest restoration is used broadly to describe situations where forest land use and land cover are restored (afforestation or reclamation), as well as instances when an existing forest is rehabilitated (no change in land cover) such that structure or species composition are modified.

Bradshaw, A.D. (1997):
What do we mean by restoration? In: Urbanska, K.M.; Webb, N.R.; Edwards, P.J. (eds.) Restoration Ecology And Sustainable Development, 8-14. Cambridge University Press, Cambridge, UK

Cairns, J., Jr. (1986):
Restoration, reclamation, and regeneration of degraded or destroyed ecosystems. In: Soule, M.E. (ed.) Conservation Biology, 465-484. Sinauer Publishers, Ann Arbor, MI.



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